

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
18 November 2004 (18.11.2004)

PCT

(10) International Publication Number
WO 2004/099721 A1

(51) International Patent Classification⁷: **G01C 21/36**

(21) International Application Number:
PCT/SE2003/000768

(22) International Filing Date: 12 May 2003 (12.05.2003)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): **TELEFONAKTIEBOLAGET LM ERICSSON** (publ)
[SE/SE]; S-164 83 Stockholm (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **JONSSON, Björn**
[SE/SE]; August Plyms väg 12, S-133 33 Saltsjöbaden
(SE). **NYBERG, Marcus** [SE/SE]; Baldersvägen 40,
SE-856 40 Sundsvall (SE). **GOLDSTEIN, Mikael**
[SE/SE]; Valhallavägen 130, S-114 41 Stockholm (SE).

CHINCHOLLE, Didier [FR/SE]; Skansvägen 19, S-191
45 Stockholm (SE). **HJELM, Johan** [SE/SE]; JCH
Ekonomikonsulterna, Box 2021, S-750 02 Uppsala (SE).

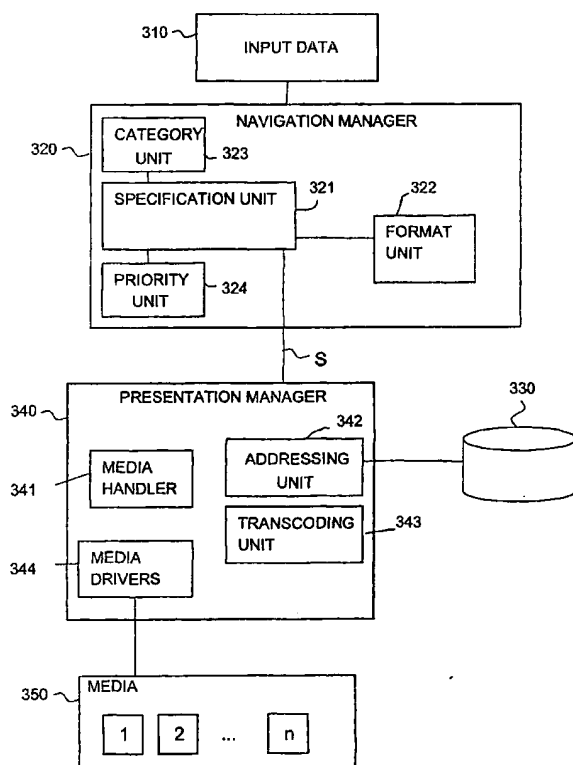
(74) Agent: **AROS PATENT AB**; P.O. Box 1544, S-751 45
Uppsala (SE).

(81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR GENERATION OF REAL-TIME GUIDING INFORMATION



(57) Abstract: A system and method is disclosed for generating information for use, for example, in a vehicle for guidance of driver. Information is described by information object specifications determined in part from compiled data related to the vehicle and its immediate environment, navigation area, target area, and user profile. An analysis and control part (320, 340) of the system creates information objects, optionally assigns priority to the same, and assigns a medium for presentation of an information object. A system state may be determined related to current use of available media. An information object of high priority can cause the control part to reallocate a medium to allow presentation of the high priority information object. The system may further determine need for format transcoding to allow presentation of information on the most appropriate medium.

WO 2004/099721 A1



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— with amended claims

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD AND SYSTEM FOR GENERATION OF REAL-TIME GUIDING INFORMATION

BACKGROUND OF THE INVENTION

5 *Technical field*

This invention relates generally to navigation systems and, in particular, to a method and system for presenting guiding information to a user comprising audile and visual information.

10

Background

Invent of position systems like GPS (Global Positioning System) is the foundation for navigation systems, e.g. in vehicles. These systems usually comprise
15 displaying a map of suitable scale indicating the current position of the vehicle. In addition, advice can be provided relating to road selection e.g. at road crossings and highway exits. The advice can be provided in text or as audio messages. Map data and informative messages are usually stored on a local storage medium, e.g. a compact disc. A position determining system, e.g. a GPS
20 receiver, generates position data that is input to a control system for selection and presentation of display images and informative messages. A characteristic of these systems is that they are static in the sense that display images and messages are independent of user context. The dynamic properties of known systems are usually limited to a dependence on the position of the vehicle.
25 Furthermore, the type of images displayed in known systems is the same, independent of user context and usually directed towards assisting a driver in route selection.

There is, thus, a need for an improved navigation system that overcomes deficiencies of known systems and adds further functionality.

Related art

5 An improved navigation system is disclosed in US Patent 6,182,010 by Viktors Berstis. According to Berstis a visual image, e.g. a photograph, of the location is retrieved and displayed when the vehicle approaches a given location. This allows a driver to more accurately assess the position e.g. relative to an intersection where an action may be needed. Further, according to Berstis, the
10 dynamic characteristics of the system are improved in that there is a set of visual images, e.g. photographs, relating to different times of day and/or different times of the year. Berstis also discloses downloading the display data from a server improving the dynamic characteristics of changing environmental data. The system of Berstis is directed towards assisting a driver in the selection of route
15 and does not mention any other type of guidance. The Berstis system is, further, independent of other contextual data than vehicle position and time of day or year.

The European Patent Application EP 1069406 and German Patent DE 19738764
20 disclose a system for guiding a driver comprising the display of graphical information representative of topographical characteristics forehead of the driver. For example, a graphical curve section indicates direction and radius of curvature of an upcoming curve in the road. The type of guiding information aims to support a safe drive. The displayed images are representative of objects and/or
25 topographical characteristics forehead of the driver and may change display position, form, or color in dependence of vehicle position and speed of vehicle.

SUMMARY OF THE INVENTION

It is a general object to provide an improved method and system for efficiently providing guiding information to a person performing a particular primary task
5 such as driving a car.

It is also an object of the invention to present guiding information using presentation medium such as to cause as little distraction as possible from a primary task. In this respect it is particularly desirable to be able take the degree
10 of importance of a new guiding information message into account in the overall process of presenting guiding information.

Another object of the invention is to create guiding information in dependence of a consideration of input information received from a plurality of information
15 sources.

These and other objects are met by the invention as defined by the accompanying patent claims.

20 In a first aspect of the invention, a basic idea is to generate information for guiding or informing a driver of a vehicle whereby input information is processed from a plurality of input information sources. For each received information data, a corresponding data category is determined, and at least partly in dependence on the category of data, a specification of at least one presentation information
25 object is generated. At least one medium for presentation is determined for each considered presentation information object. Information associated with the presentation information object(s) is then retrieved at least in accordance with the specification and preferably also the medium or media, and finally the information is output for presentation.

- In different aspects of the invention, the input information can relate to the vehicle and its immediate neighborhood, a geographical area that is calculated to be traversed from the current vehicle position to a specified target, information characteristic of the target, and/or user specified requirements or preferences.
- 5 More specifically, a vehicle information object can be characterized by properties relating to vehicle condition as indicated by various sensors, vehicle velocity, environmental conditions including road near characteristics. A calculated area to be traversed can be described as a navigation information object characterized as comprising road sections with certain properties, various services, and various
- 10 points of interest. A target information object can be described in terms of object structures, e.g. a city comprises a street infrastructure and provides services such as hotel services that can be further described in terms of room availability and quality, price, reception opening hours and so forth. A user information object can comprise information relating to a preferred route passing certain places,
- 15 quality and price of hotel that conveniently correspond to a preferred time for overnight. It is desirable, when possible considering the primary task, to present information according to user preferences for example relating to points of interest.
- 20 It is has further turned out to be particularly advantageous to provide a rule-based engine for managing input information received from a plurality of input information sources.
- According to a preferred embodiment the type or category of input is determined
- 25 for the input data. Exemplary types or categories include position data, vehicle condition data such as temperature and fuel, weather forecast, traffic data, user specified data such as historical data about visited places. Input data and corresponding data category are processed to determine a specification of a message and corresponding information is retrieved from specified storage
- 30 locations if not included as part of the input data. For example, depending on the condition of the vehicle the driver may need to find a service station. The system

can determine from user preference information the preferred type of service station and calculate from position data a suitable route whereby map data is retrieved from a map information source.

- 5 Preferably, a user can receive guiding information through several media, e.g. one or several audio and video channels.

- Advantageously, the guiding system can select or transform information for presentation in a format that is most convenient for the user. It is highly desirable
- 10 to provide means for transcoding an original guiding information message into a format suitable for presentation on the most appropriate medium considering the effect of distraction from the primary task. For example, text information can be transcoded into audio information. Another type of format conversion comprises transcoding visual information from one visual format to another visual format.
- 15 For example, at high speed the driver would prefer not to be distracted by irrelevant information and unnecessary details related to objects in the neighborhood could be deleted and, in some instances, object abstractions may convey the necessary information for a safe and correct driving.
- 20 It has been recognized that specific demands on the driver, e.g. a need for high focus on road conditions when driving at a high speed or at difficult driving conditions related to weather or traffic conditions make certain guiding information more important than other information.
- 25 Therefore, in a second aspect of the invention, a priority level for information from at least one of the information sources is determined. The information in question may be presentable through several media. Next, a medium for presentation of the information is selected at least partly in dependence on the priority level, and finally the information is presented through the selected medium.

In this respect, it is highly desirable to provide means for managing media such that a more important message can interrupt or disrupt an occupied medium for immediate presentation of information of higher importance.

- 5 It has turned out to be particularly beneficial to first determine for which medium that the presentation information object is primarily intended. If this medium is currently occupied, it is determined in dependence on said priority level whether said information should be overlaid on the medium, or the ongoing presentation should be interrupted for allowing presentation of the new presentation
10 information or another one of the media should be used for presentation.

- In another aspect of the invention the guiding information also depends on target characteristics. For example, a targeted hotel or camping area may be unmanned and closed for new visitors after a certain time of the day. Such
15 information is valuable to the driver when planning the route. A particular case comprises a moving target whereby guiding information is presented to the driver of each vehicle aiming to find a suitable meeting place. In this case the guiding information presented to each driver may depend on, besides the position of each driver, other characteristics of a calculated meeting place. For example, a
20 meeting place on a highway would apparently not be possible for several reasons.

- It is desirable that a user in advance of commencing the travel can prepare certain data. These data may be stored locally at the vehicle or at a network node
25 for downloading. The data may relate to the position of the vehicle or to vehicle condition. Exemplary, when there is a need to fill up fuel a petrol station of preference may be located. Some of these data may be more static stored in a static user profile whereas other data may relate to a specific occasion and stored in a dynamic user profile.

The in advance prepared data is preferably retrieved at certain events for processing. For example an event, representing a type of input data recorded by input data means, may comprise reaching a predefined position. Data associated with this event typically relate to hot spots in the neighborhood of the event triggering position. Event associated data is retrieved from specified locations, e.g. identified by a URL address.

Advantageously a user can edit the user profile at any time during the travel and, for example, modify a desire to find the fastest route disregarding any costs for road tolls.

The invention offers the following advantages:

- guiding information is determined on basis of data from a plurality of relevant information sources,
- guiding information is presented on the medium that is most appropriate from the point of view of safety and other priority factors,
- priority is assigned to guiding information messages allowing high priority messages to override low priority messages,
- guiding information can be transcoded from a format to another,
- guiding information can be prepared by user in advance of travel for use at the occurrence of a trigger event.

Other advantages offered by the present invention will be appreciated upon reading of the below description of the embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the invention and its advantages the following detailed description should be taken in conjunction with the accompanying drawings of which:

Figure 1 is an exemplary data object model related to the invention;

Figure 2 illustrates an exemplary structure of a type of information object;

- 5 Figure 3 is a simplified illustration of an arrangement according to an exemplary embodiment of the invention; and

Figure 4 shows the steps in a method according to an exemplary embodiment of the invention.

10

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

- Figure 1 shows a data object model related to the invention. At 110 a vehicle information object is illustrated that relates to the vehicle and its immediate
15 environment. Data relating to this object may be obtained from sensors associated with the vehicle measuring e.g. speed, fuel, temperature of cooling water, and outside temperature. Environmental data pertaining to, e.g., the weather or the traffic situation may be obtained from broadcast transmission, e.g., through a digital broadcast system such as the RDS system (Radio Data
20 System) preferably over the TMC channel (Traffic Message Channel). For more information on TMC, reference is made to the following World Wide Web link http://www.tmcforum.com/tmc/what_is.htm, printed April 8, 2003.

- At 120 a navigation information object is illustrated relating to the navigation area,
25 i.e. the area that is expected to include the path between the current vehicle position and the current target position. These data may include a geographical map area determined by the system from knowledge of vehicle and target positions. Other data that may be included in the data object 120 relate to objects and places within a geographical area. In particular, a road section object
30 according to the invention has properties relating to, e.g., position on map, road characteristics, speed limitations, road tolls, and availability of services. An

exemplary data representation of a road section object is shown in Figure 2 comprising a data record 200. A first data part 210 comprises a section identity. This identity can, e.g., be used to address data storage for retrieving data for visualization of the section on a map. The data record 220 further comprises
5 property references P1 - Pn. These references address data records, e.g. data records 230 and 240. Exemplary, data record 230 may include information about speed limitations and a normal time to travel the section. Data record 240 may pertain to a service station whereby a user can obtain information about its location, opening hours, available services, and credit cards that are accepted.

10

At 130 a user information object is illustrated. This object may comprise user specifications e.g. relating to characteristics of the desired route. Besides dynamic data pertaining to a specific occasion, time period, or journey, the user profile also comprises more static data. Static data can e.g. identify sensors at
15 the vehicle for various measurements, addresses to remote locations for download of specified information, and events that should occur when a specified parameter value reaches a specified limit value. For example, if the fuel level decreases below a preset value, guiding information may appear for locating a fuel station of preferred mark. Dynamic data may refer to places that should be
20 visited during the travel and references to information sources that can provide information about a visited place. Other dynamic data may relate to hotels that are planned for overnights.

At 140 there is illustrated a target information object. This object can include
25 position of a target and other data in dependence of specifications in the user profile 130 or requirements derived therefrom by the system. For example, if the target object is a hotel and the user profile specifies a desire to check-in at that hotel, the system retrieves hotel check-in times and derives a planned time of arrival. If the navigation system determines that time of arrival will not be before
30 reception closes if the planned route is followed, the system proposes a changed route if possible and, otherwise, locates a closer hotel of similar standard. It is

thus understood that a target can change during travel depending on changing circumstances or desires. An initial target can comprise an identified city. When approaching the city a user can redefine target according to what city objects that are available. For example, there can be selectable city tours in turn comprising objects such as famous buildings and museums. From a previous example, relating to a user receiving an alarm that service of the vehicle is needed, it is further clear that the navigation system can temporarily change a target. Thus, e.g., when fuel has been filled up after stop at a fuel station, the system resets the target to the original.

In a particular case, the target is another vehicle and a common objective for the two parties is to find a suitable meeting place. The navigation managers of the two vehicles constantly update routes to take. The navigation manager also determines that a suitable meeting place must allow both vehicles to stop and the two parties to physically meet. Thus, e.g., the meeting place should preferably not be located along a highway. Further conditions on a meeting place can be agreed by the two parties, e.g. that a meeting place should be close to or at a restaurant. The navigation manager of the respective vehicle calculates a route for each vehicle based on these and other data pertaining to the navigation area and user specifications whereby the analysis can use road section characteristics.

Generally, the information or data objects 110 – 140 can contain further data objects. For example, data object 120 may contain road object further comprising road section objects. Data pertaining to the data objects are of a variety of data types such as graphical images, photographic images, text, audio, and video. A particular data object can have several representations, e.g. a photographic image and an object abstraction in the form of a graphical image. In some cases a transcoder converts an object representation from one type of medium to another type, e.g. from text to audio.

Figure 3 shows a simplified illustration of a system according to an exemplary embodiment of the invention. The system includes means 310 for compiling input data for example received from sensor means at the vehicle, storage means 330 including user profile and data relating to objects. The storage means 330
5 generally comprises a local part and a remote part for downloading of data for example over a wireless connection. At 320 there is shown a navigation manager. The navigation manager has a specification unit 321 for operating on the input data to generate a specification of guiding information. For example, from knowledge of vehicle and target positions, provided in input data 310, the
10 navigation manager determines a specification of map information illustrating a possible route to follow or the navigation manager detects deviation of received input data from predetermined level causing it to generate a message description. The navigation manager 320 further includes format unit 322 for determining a preferred information format, e.g. voice. There is also a data
15 category unit 323 for determining a category of the input data information. Category of data information may relate to alarm data received from vehicle sensors, broadcast information received e.g. from an RPS-system or the occurrence of an event e.g. the reaching of a predefined position.

20 Prior to forming a message specification at specification unit 321, a message priority may be determined at priority unit 324. The priority unit 324 analyses a received input file and normally determines a message priority at least partly in dependence of input information category. The message priority is preferably included in the output specification S from the specification unit 321.

25 At 340 there is illustrated a presentation manager for forming presentation data according to a specification of guiding information. The specification, in addition, preferably includes information for retrieval of specified information. Included in the presentation manager 340 there is an addressing unit 342 for accessing
30 specified data from local or remote sources, e.g. database 330. The presentation

manager 340 further has a media handler 341 for allocation of medium or media appropriate for a presentation according to the format specification.

The media handler 341 typically manages media and allocation of media to messages for presentation. The media handler 341 can further determine a system state. A system state can specify messages being processed and allocated to a medium, messages having been interrupted or deleted or queued for later presentation.

- 10 The presentation manager 340 further has a transcoding unit 343 for transcoding information that resides at database 330 originally stored in a format not conforming to the specified preferred format. For example, if input data indicates that the driver of a vehicle is likely not benefited from a very detailed map the navigation manager includes, in the format specification, directives to replace
15 certain objects with abstractions thereof, e.g. obtained from a symbol database 330.

- The media handler 341 in consideration of system status and priorities of incoming messages determines actions, e.g. that a new message shall be overlaid on an already occupied medium, or that an ongoing presentation shall be temporarily interrupted for presentation of the new message, or that a free medium shall be allocated to the new message. The media handler can also determine that a new message shall be transcoded into a format different from the original format specified in the specification S output from specification unit
25 321. For example, if the preferred format of a new message is determined to be voice, the priority is determined to be low, and the voice medium is occupied with a higher priority task, then the media handler can initiate transcoding of the new message into a text message.

- 30 A media file is output, preferably from media handler 341, comprising various media parts further managed by corresponding media drivers included in driver

unit 344. Each driver in the driver unit 344 drives a corresponding one of the available media, 1-n, 350.

Visual map information is conveniently prepared by presentation manager 340
5 and oriented such that the vehicle velocity vector is normally directed upwards on a displayed map. This arrangement facilitates the identification of objects in the surrounding of the vehicle e.g. located to the left, right, or in front of the vehicle.

It should be understood that Fig. 3 provides a functional overview of an
10 exemplary system, and that other specific implementations may be equally feasible.

Figure 4 shows a flow chart illustrating the steps of a method according to a preferred embodiment of the invention. At step 410 input data is compiled from
15 various sources for determining guiding information. At step 420 additional data typically is determined from rules operating on the input data. The rules are normally software implemented at the navigation manager. For modifications of the rules a user can manipulate at least part of a rules database. At step 430 the format of presentation data is determined. This step too preferably depends on
20 the evaluation of rules operating on input parameters. For example, if speed of vehicle exceeds a certain limiting value rules evaluate for determining suitable presentation formats, e.g. excluding detailed graphical information for display. In the optional, but often advantageous, step 435 the priority of new information is compared with priority of ongoing presentation and appropriate actions are
25 invoked. In step 440 presentation data is generated that conforms to the determined presentation formats. This step may include transcoding of certain data that cannot directly be retrieved in the most appropriate format. Certain data, stored in several formats, is retrieved according to the determined and preferred format. At step 450 the calculated guiding information is presented on a
30 specified medium.

It is understood that the foregoing description shall be taken by way of example only not limiting the scope of the invention and that a person skilled in the art therefrom shall be able to derive a variety of further implementations of the invention.

CLAIMS

1. A system for producing guiding information for a user in a vehicle having means (310) for receiving information from a plurality of information sources
5 and means for presenting information through a plurality of media (350),
characterized by:
- means (323) for determining, for each received information data, a corresponding data category,
 - means (321) for determining at least partly in dependence of the
10 category of data a specification of at least one presentation
information object,
 - means (341) for determining at least one medium for presentation of
said at least one presentation information object,
 - means (342) for retrieving information associated with said at least
15 one presentation information object and in accordance with said
specification, and
 - means (340) for output of said at least one presentation information
object for presentation on said at least one presentation medium.
- 20 2. The system of claim 1, **characterized** by said means (340) for output
including means (343) for transcoding the retrieved information into a format
that matches said at least one medium for presentation.
3. The system of claim 1, **characterized** in that said data includes information
25 relating to at least one of a vehicle information object (110), a navigation
information object (120), a user information object (130) and a target
information object (140).

4. The system of claim 3, **characterized** in that the navigation information object (120) includes road section objects at least characterized by having at least one of length, service points, road tolls and points of interest.
- 5 5. The system of claim 3, **characterized** in that the target information object (140) includes a representation of another moving vehicle and said at least one presentation information object includes a representation of an instantaneous route to a meeting place at least fulfilling predetermined characteristics.
- 10 6. The system according to any of the previous claims, **characterized** by:
- means (341) for determining a system state, and
 - means for enforcement of rules applied to the specification of at least one information object and the system state, the rules further
- 15 being operative to change the system state.
7. The system of claim 6, **characterized** in that:
- the system state includes allocation of available media to presentation information objects,
- 20 - said change of system state involving a reallocation of at least one medium.
8. The system of claim 6, **characterized** in that said means for enforcement of rules generates a request for transcoding of said at least one presentation
- 25 information object.
9. The system of claim 1, **characterized** by:
- means (323) for determining a priority level for said at least one presentation information object;

- means (322) for determining which medium that said at least one presentation information object is primarily intended for;
- means (341) for determining, if said determined medium is currently occupied by an ongoing presentation, whether said information should be overlaid on said medium, or said ongoing presentation should be interrupted for allowing presentation of said information or another one of said media should be used for presentation, in dependence on said priority level.

10 10. A method for producing guiding information for a user in a vehicle capable of receiving information from a plurality of information sources and presenting information through a plurality of media, **characterized** by the steps:

- determining, for each received information data, a corresponding data category,
- 15 - determining at least partly in dependence of the category of data a specification of at least one presentation information object,
- determining at least one medium for presentation of said at least one presentation information object,
- 20 - retrieving information associated with said at least one presentation information object and in accordance with the specification and said at least one medium for presentation, and
- presenting through said at least one medium the retrieved information.

25 11. The method of claim 10, **characterized** by the step of transcoding the retrieved information into a format that matches said at least one medium for presentation.

12. The method of claim 10, **characterized** in that said data comprises information relating to at least one of a vehicle information object (110), a navigation information object (120), a user information object (130) and a target information object (140).

5

13. The method of claim 12, **characterized** in that the navigation information object (120) includes road section objects at least characterized by having at least one of length, service points, road tolls, and points of interest.

10 14. The method of claim 12, **characterized** in that the target information object (140) includes a representation of another moving vehicle and said at least one presentation information object includes a representation of an instantaneous route to a meeting place at least fulfilling predetermined characteristics.

15

15. The method according to claim 12, **characterized** in that target information in said target information object (140) is changeable in dependence of information in at least one of said vehicle information object (110), said navigation information object (120) and said user information object (130).

20

16. The method according to any of the claims 10 – 15, further **characterized** by:

- determining a system state, and
- said step of determining a specification includes enforcement of rules applied to the input file and the system state, the rules further

25 operative to change the system state.

25

17. The method of claim 16, **characterized** in that:

- the system state includes allocation of available media to presentation information objects,
- said change of system state involves reallocation of medium.

30

18. The method of claim 10, **characterized** by the further steps of:

- determining a priority level for said at least one presentation information object;
- 5 - determining which medium that said at least one presentation information object is primarily intended for;
- determining, if said determined medium is currently occupied by an ongoing presentation, whether said information should be overlaid on said medium, or said ongoing presentation should be interrupted for allowing presentation of said information or another one of said
10 media should be used for presentation, in dependence on said priority level.

19. A method for producing guiding information for a user in a vehicle capable of receiving information from a plurality of information sources and presenting
15 information through a plurality of media, **characterized** by the steps:

- determining a priority level for information from at least one of said information sources;
- selecting medium for presentation of said information at least partly in dependence on said priority level;
- 20 - presenting said information through said selected medium.

20. The method according to claim 19, further **characterized** by the steps:

- determining which medium that said at least one presentation information object is primarily intended for;
- 25 - determining, if said determined medium is currently occupied by an ongoing presentation, whether said information should be overlaid on said medium, or said ongoing presentation should be interrupted for allowing presentation of said information or another one of said

media should be used for presentation, in dependence on said priority level.

[received by the International Bureau on 01 March 2004 (01.03.2004);
original claims 1-20 replaced by amended claims 1-18 (4 pages)]

1. A system for producing guiding information for a user in a vehicle having means (310) for receiving information from a plurality of information sources and means for presenting information through a plurality of media (350),
5 characterized by:
- means (321) for processing information from a plurality of said information sources to create a specification of a message comprising at least one information object,
 - 10 - means (341) for determining preferred medium for presentation of said message in a first format, and for determining an alternative medium for presentation of said message in a second format;
 - means (342) for retrieving information associated with said at least one information object, and
 - 15 - means (340) for output of information associated with said at least one information object for presentation on a selected one of said preferred medium and said alternative medium.
2. The system of claim 1, **characterized** in that said means (340) for output comprises means (343) for transcoding said message into said second format
20 for presentation on said alternative medium, wherein said second format is different from the original first format specified in the message specification.
3. The system of claim 1, **characterized** in that said means (340) for output comprises means (343) for replacing at least one information object by a
25 stored abstraction of the object from a symbol database (330).
4. The system of claim 1, **characterized** in that said information is related to at least one of a vehicle information object (110), a navigation information object
30 (120), a user information object (130) and a target information object (140).

5. The system of claim 4, **characterized** in that the navigation information object (120) includes road section objects at least characterized by having at least one of length, service points, road tolls and points of interest.
- 5
6. The system of claim 4, **characterized** in that the target information object (140) includes a representation of another moving vehicle and said at least one presentation information object includes a representation of an instantaneous route to a meeting place at least fulfilling predetermined characteristics.
- 10
7. The system according to any of the previous claims, **characterized** by:
- means (341) for determining a system state, and
 - means for enforcement of rules applied to the specification of at least one information object and the system state, the rules further being operative to change the system state.
- 15
8. The system of claim 7, **characterized** in that:
- the system state includes allocation of available media to information objects,
 - said change of system state involving a reallocation of at least one medium.
- 20
9. The system of claim 7, **characterized** in that said means for enforcement of rules generates a request for transcoding of said at least one information object.
- 25

10. A method for producing guiding information for a user in a vehicle capable of receiving information from a plurality of information sources and presenting information through a plurality of media, **characterized** by the steps:

- 5 - processing information from a plurality of said information sources to create a specification of a message comprising at least one information object,
- determining preferred medium for presentation of said message in a first format and an alternative medium for presentation of said message in a second format;
- 10 - retrieving information associated with said at least one information object, and
- presenting information associated with said at least one information object on a selected one of said preferred medium and said alternative medium.

15

11. The method of claim 10, **characterized** by transcoding said message into said second format for presentation on said alternative medium, wherein said second format is different from the original first format specified in the message specification.

20

12. The method of claim 10, **characterized by** replacing at least one information object by a stored abstraction of the object from a symbol database (330).

25

13. The method of claim 10, **characterized** in that said information is related to at least one of a vehicle information object (110), a navigation information object (120), a user information object (130) and a target information object (140).

30

14. The method of claim 13, **characterized** in that the navigation information object (120) includes road section objects at least characterized by having at least one of length, service points, road tolls, and points of interest.

15. The method of claim 13, **characterized** in that the target information object (140) includes a representation of another moving vehicle and said at least one information object includes a representation of an instantaneous route to a meeting place at least fulfilling predetermined characteristics.

16. The method according to claim 13, **characterized** in that target information in said target information object (140) is changeable in dependence of information in at least one of said vehicle information object (110), said navigation information object (120) and said user information object (130).

17. The method according to any of the claims 10 – 16, further **characterized** by:

- determining a system state, and
- enforcement of rules applied to the specification of at least one information object and the system state, the rules further being operative to change the system state.

18. The method of claim 17, **characterized** in that:

- the system state includes allocation of available media to information objects,
- said change of system state involves reallocation of medium.

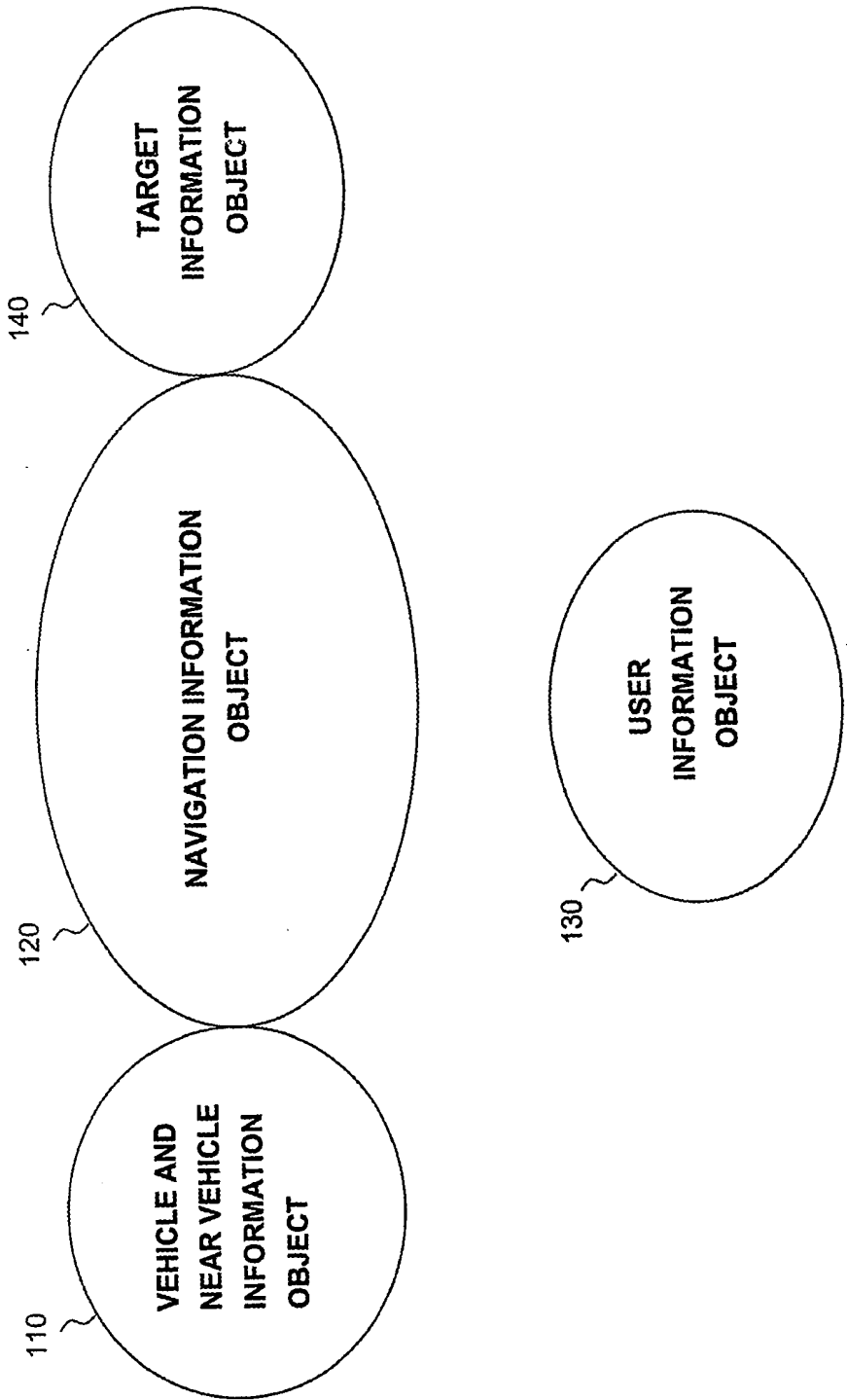


Figure 1

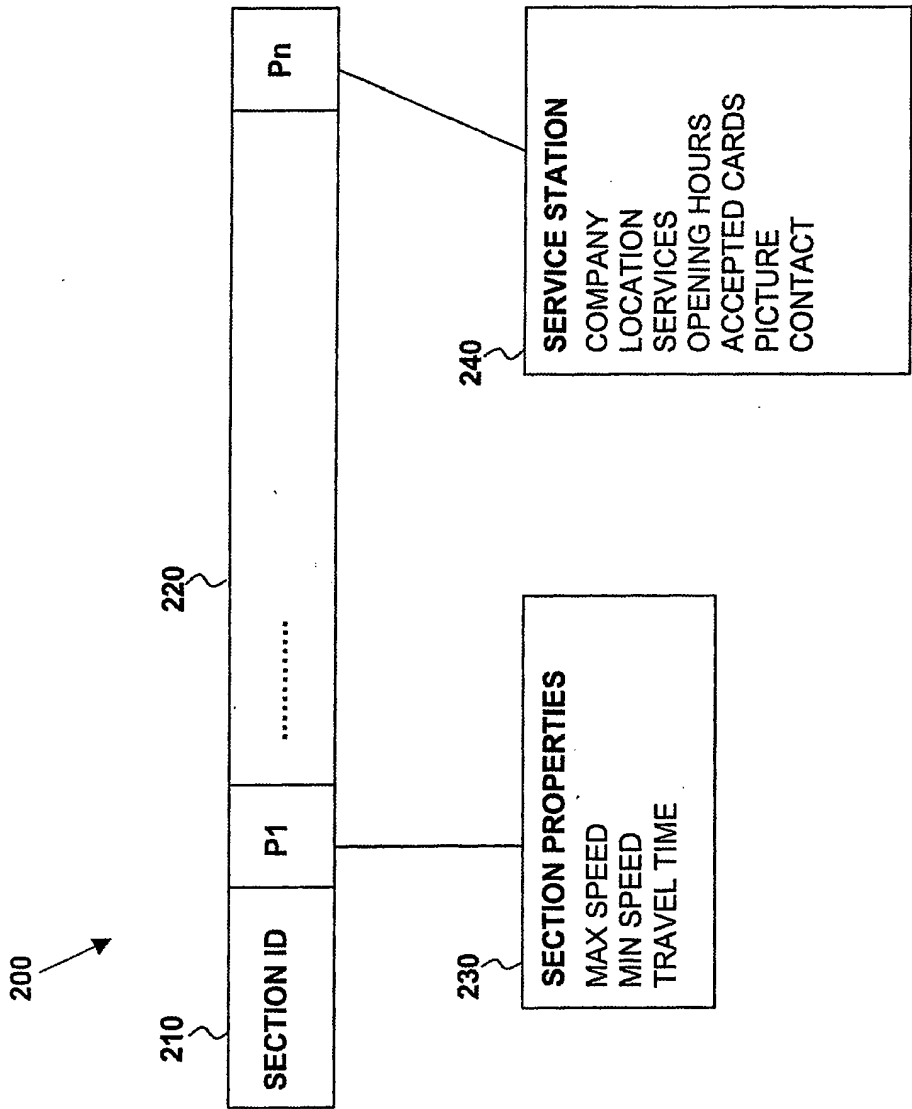


Figure 2

3/4

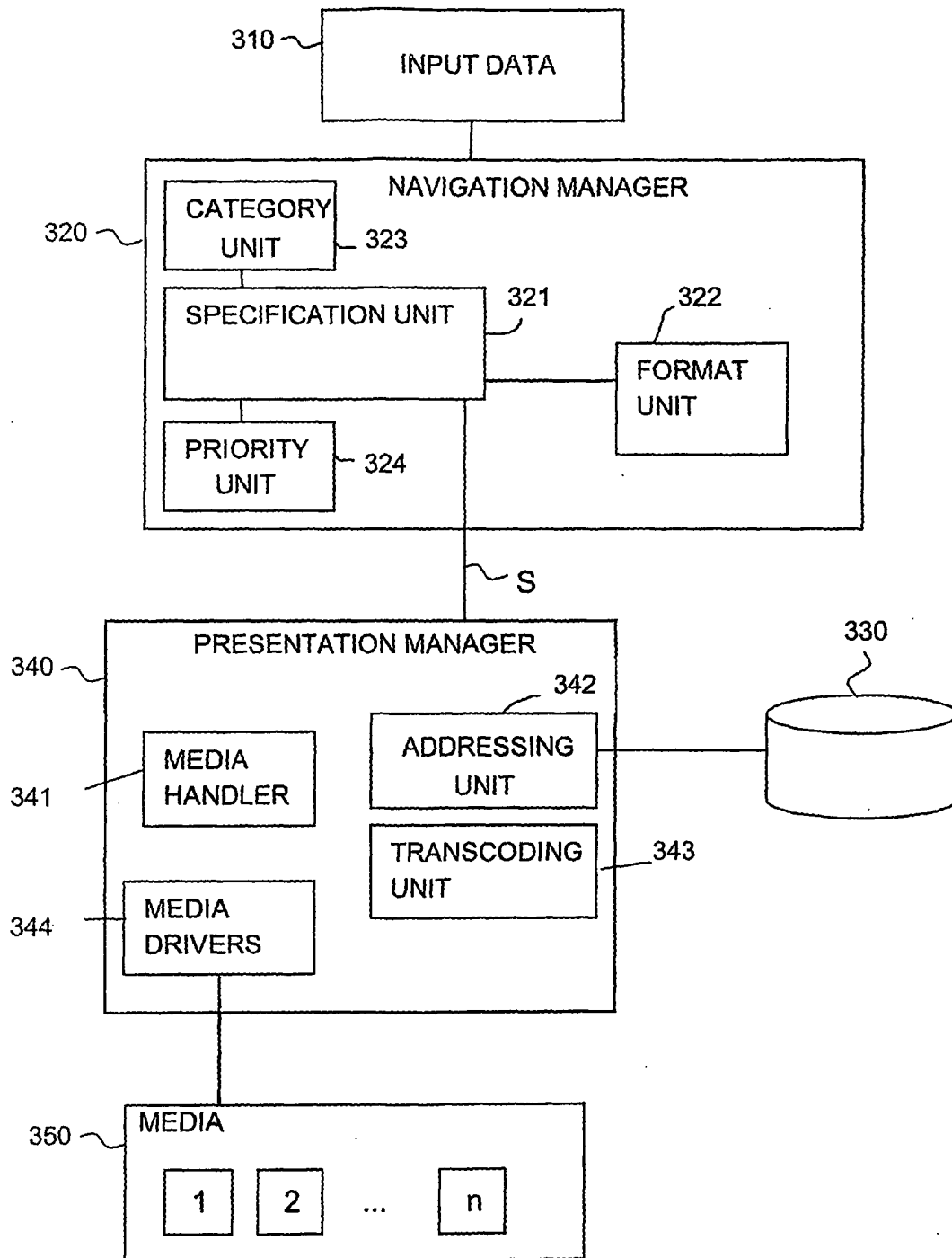


Figure 3

4/4

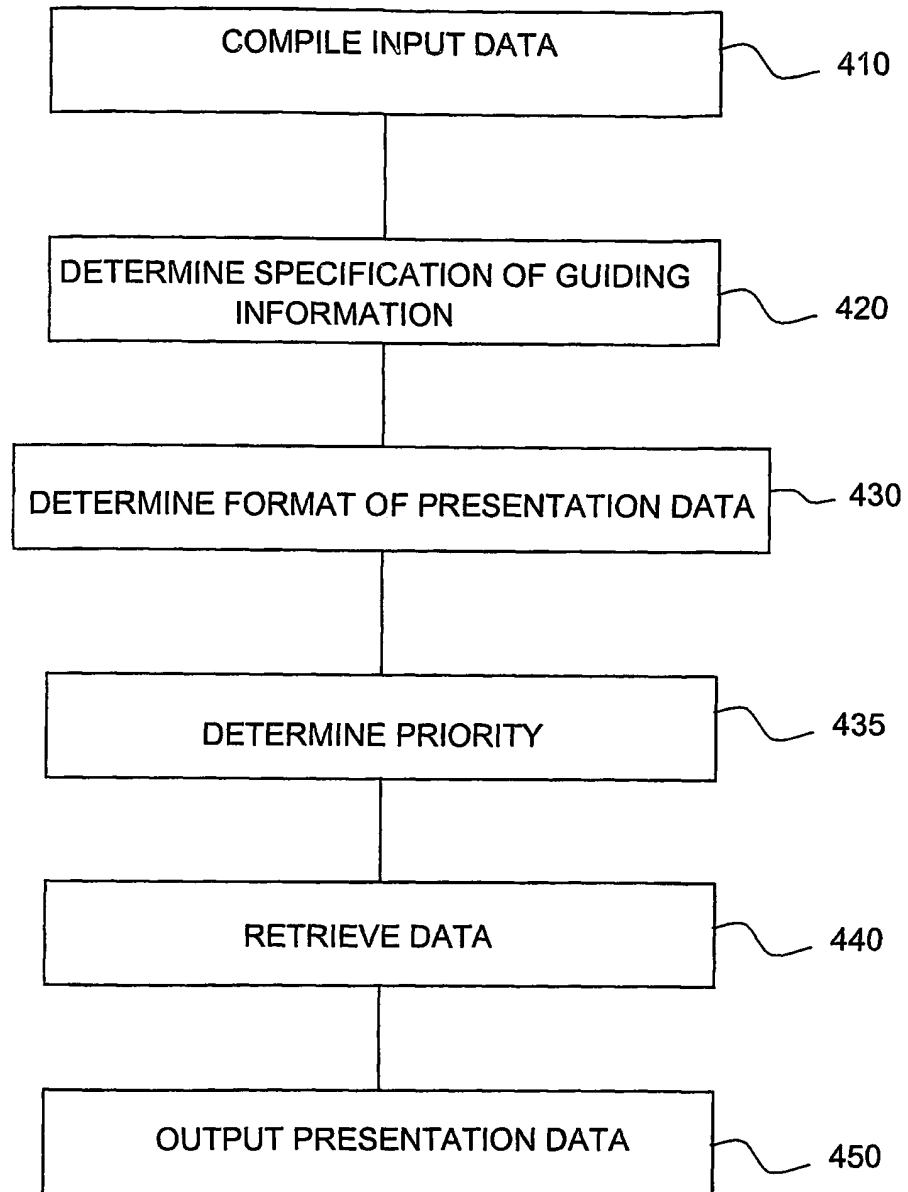


Figure 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00768

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G01C 21/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6208932 B1 (H.OHMURA ET AL), 27 March 2001 (27.03.01), see the whole document	1-3,6-12, 16-20
Y	--	4-5,13-15
X	US 6381534 B2 (K.TAKAYAMA ET AL), 30 April 2002 (30.04.02), column 2, line 35 - line 61; column 38, line 34 - line 46; column 49, line 26 - line 38, col 55, li.5-li 15	19-20
Y	--	4-5,13-15
X	EP 0771686 A2 (T.J.KABUSHIKI KAISHA), 7 May 1997 (07.05.97), column 4, line 10 - line 59; column 6, line 22 - line 32; column 10, line 29 - line 39	1-4,10-13,19
	--	

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

13 November 2003

Date of mailing of the international search report

25-11-2003

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Henrik Eriksson/itw

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00768

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6349257 B1 (TE-KAI LIU ET AL), 19 February 2002 (19.02.02), abstract, see the claims --	4,13,15
Y	US 6356839 B1 (Y.MONDE ET AL), 12 March 2002 (12.03.02), column 6, line 55 - line 67, figure 1, abstract	4,13
A	--	1-3,5-12, 14-20
A	US 6182010 B1 (V.BERSTIS), 30 January 2001 (30.01.01), see the whole document -- -----	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

06/09/03

International application No.

PCT/SE 03/00768

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	6208932	B1	27/03/01	DE	19743249 A	02/04/98
				JP	10104003 A	24/04/98
				JP	10104004 A	24/04/98
US	6381534	B2	30/04/02	DE	10105394 A	30/08/01
				JP	2001306590 A	02/11/01
				US	2001020211 A	06/09/01
				JP	2001311626 A	09/11/01
EP	0771686	A2	07/05/97	DE	69613653 D,T	08/05/02
				JP	9123848 A	13/05/97
				US	5764139 A	09/06/98
US	6349257	B1	19/02/02	NONE		
US	6356839	B1	12/03/02	EP	1087206 A	28/03/01
				WO	0062019 A	19/10/00
US	6182010	B1	30/01/01	EP	1024347 A	02/08/00
				JP	2000221044 A	11/08/00